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L4 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2003 ACS on STN

AB Undoped and MgO-doped TiO₂- and BaO-excess **non-stoichiometric barium titanate** (BaTiO₃) compns. were pressureless sintered using a conventional furnace and CO₂ laser. High-temp. hexagonal BaTiO₃ was metastably retained to room temp. as revealed by both X-ray diffractometry and transmission electron microscopy. The sintered microstructure of the TiO₂-excess compn. is characterized by a bimodal grain size distribution contg. large plate-like grains. The microstructure of BaO-excess BaTiO₃ with MgO doping is characterized by large spherulitic grains with petals 1-2 mm long. Hexagonal phase retention in the undoped material is only obtained when quenching the laser-sintered BaO-excess **powder**. However, it occurs in both **non-stoichiometric** BaTiO₃ compns. with MgO doping, regardless of the sintering techniques. A possible mechanism for the hexagonal phase stabilization assocd. with oxygen vacancies is discussed.

ACCESSION NUMBER: 2001:167045 CAPLUS

DOCUMENT NUMBER: 134:255629

TITLE: Hexagonal-phase retention in pressureless-sintered **barium titanate**

AUTHOR(S): Lin, Ming-Hong; Lu, Hong-Yang

CORPORATE SOURCE: Institute of Materials Science and Engineering,
National Sun Yat-Sen University, Kaohsiung, 80424,
Taiwan

SOURCE: Philosophical Magazine A: Physics of Condensed Matter:
Structure, Defects and Mechanical Properties (2001),
81(1), 181-196

CODEN: PMAADG; ISSN: 0141-8610

PUBLISHER: Taylor & Francis Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

REFERENCE COUNT: 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

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ANSWER 1 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The domain behavior of **ferroelec.** materials was investigated by elec. fields such as poling field and bipolar pulse. **Ferroelec.** materials evaluated consist of **lead zirconate titanate (PZT)**, **lead titanate (PT)**, **barium titanate (BT)**, Bi-layer structured **SrBi₄Ti₄O₁₅ (SBT)** ceramics and **Pb(Zn_{1/3}Nb_{2/3})_{0.91}Ti_{0.09}O₃ (PZNT)** **relaxor based** single crystal. Changing the poling field (E) from 0.fwdarw.+E.fwdarw.0.fwdarw.-E.fwdarw.0 to +E, the electromech. coupling factor (k), dielec. const. (.vepsiln.r) and frequency const. (fc) were measured. The min. k and .vepsiln.r were obtained at the same E because of the 180.degree. domain clamping. The E due to the domain clamping corresponded to the coercive field (Ec) detd. by the poling field dependence. At the Ec, the max. fc was confirmed in the cases of soft PZT (tetragonal and rhombohedral), hard PZT (tetragonal), BT ceramics and PZNT single crystal. It was thought that the materials became mech. hard by the elec. attracting through the domain clamping (.uparw..dwnarw.). In hard PZT (rhombohedral), PT, BT and SBT ceramics, the peak of .vepsiln.r and/or the min. fc were obsd. at an E, which corresponds to the threshold of domain rotations. At the E, the ceramics become mech. soft because of 90.degree., 71.degree. or 109.degree. domain rotations. The effect of bipolar pulse will also be described.

ACCESSION NUMBER: 2003:440759 CAPLUS
TITLE: Domain behavior by electric fields in **ferroelectric** ceramics and single crystals
AUTHOR(S): Ogawa, Toshio
CORPORATE SOURCE: Department of Electronic Engineering, Shizuoka Institute of Science and Technology, Fukuroi, Shizuoka, 437-8555, Japan
SOURCE: Advances in Science and Technology (Faenza, Italy) (2003), 33 (10th International Ceramics Congress, 2002, Part D), 607-613
CODEN: ASETE5
PUBLISHER: Techna
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 2 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Dilatometer **based** thermal expansion studies have been carried out on the starting oxide mixts. of some of the important **relaxor ferroelec.** compns. including **lead iron niobate**, **lead magnesium niobate-lead titanate** and **lead zinc niobate-barium titanate**. An anomalous thermal expansion behavior is obsd. between 550 and 650 .degree.C corresponding to the onset of the solid state reaction. Further heating of the reaction mixt. resulted in a decrease in the dimension of the sample. From the complementary evidence of DTA, X-ray diffraction and SEM, it is shown that the initiation of solid state reaction results in the restructuring of the reacting grains to form the agglomerates of fine particles of reaction intermediates. This phenomenon is shown to be absent in the **barium** zinc niobate system where the pyrochlore intermediates do not exist. This novel dilatometric approach has been projected as a possible technique to identify optimum calcination temps. to produce sinter-active powders in the above oxide system, thereby help in reducing the sintering temps.

ACCESSION NUMBER: 2003:425128 CAPLUS
TITLE: Dilatometric approach for the determination of the solid state reaction-onset of the **lead based relaxor ferroelectric** system.
AUTHOR(S): Bhat, V. V.; Radhika Rao, M. V.; Umarji, A. M.
CORPORATE SOURCE: Materials Research Centre, Indian Institute of

SOURCE: Science, Bangalore, 560012, India
Materials Research Bulletin (2003), 38(6), 1081-1090
CODEN: MRBUAC; ISSN: 0025-5408
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 3 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The domain structures of **ferroelec.** materials were investigated by measuring the poling field dependence of dielec. and piezoelec. properties. The **ferroelec.** materials evaluated are as follows: soft and hard **lead zirconate titanate** (PZT) ceramics with tetragonal and rhombohedral phases, **lead titanate** (PT) ceramics, **barium titanate** (BT) ceramics and a **relaxor based** single crystal of **Pb(Zn_{1/3}Nb_{2/3})_{0.91}Ti_{0.09}O₃** (PZNT). Changing the poling field (E) from 0 .fwdarw. +E .fwdarw. 0 .fwdarw. -E .fwdarw. 0 to +E, the electromech. coupling factor (kp, k33), dielec. const. (.epsilon. r) and frequency const. (fc) were measured. The min. kp, k33 and .epsilon. r were obtained at the same E because of the 180.degree. domain clamping. Further, the E due to the domain clamping corresponded to the coercive field (Ec) detd. by the poling field dependences. At the Ec, max. fc was confirmed in the cases of soft PZT (tetragonal and rhombohedral) and hard PZT (tetragonal) ceramics, BT ceramics and PZNT single crystal. It was thought that the materials became mech. hard by the elec. attracting through the domain clamping (.uparw. .gtorsim.. In hard PZT (rhombohedral), PT and BT ceramics, the peak of .epsilon. r and/or min. fc were obsd. at an E, which corresponds to the threshold of 90.degree., 71.degree. or 109.degree. domain rotations.

ACCESSION NUMBER: 2002:908876 CAPLUS
DOCUMENT NUMBER: 138:161765
TITLE: Poling field dependence of **ferroelectric** properties in piezoelectric ceramics and single crystals

AUTHOR(S): Ogawa, Toshio
CORPORATE SOURCE: Department of Electronic Engineering, Shizuoka Institute of Science and Technology, Fukuroi, 437-8555, Japan

SOURCE: Ferroelectrics (2002), 273, 371-376
CODEN: FEROA8; ISSN: 0015-0193

PUBLISHER: Taylor & Francis Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 4 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Paraelec. **Ba(Zn_{1/3}Nb_{2/3})O₃** (BZN) is realized as an implicit component in **Pb(Zn_{1/3}Nb_{2/3})O₃-PbTiO₃-BaTiO₃** (PZN-PT-BT), which decreases phase transition temp. and weakens dielec. properties. The dielec. behavior under high elec. field is investigated. Within the broad temp. range of the diffuse phase transition, PZN-PT-BT ceramics show highly induced polarization. An unusual linear relation of the polarization with elec. field is obsd. near the central portion of the hysteresis loops of some specimens, which are both temp. and compn. dependent. The obsd. **ferroelec.** properties may be understood using a model of PZN-based matrix contg. **ferroelec.** PT and paraelec. BZN nano-phase regions.

ACCESSION NUMBER: 2002:713529 CAPLUS
DOCUMENT NUMBER: 138:129645

TITLE: Microstructure and dielectric properties of PZN-PT-BT **relaxor ferroelectric** ceramics

AUTHOR(S): Wang, Xiaoli; Xu, Zhengkui; Chen, Haydn
CORPORATE SOURCE: Department of Physics & Materials Science, City
University of Hong Kong, Kowloon Tong, Hong Kong
SOURCE: Key Engineering Materials (2002), 228-229(Asian
Ceramic Science for Electronics II), 15-20
CODEN: KEMAEY; ISSN: 1013-9826
PUBLISHER: Trans Tech Publications Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 5 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Electrostrictive strain x , DC-biased dielec. const. bK33, d.c. bias
field-induced electromech. planar coupling factor bkp and piezoelec.
strain coeff. bd31 of La, Bi, Sr and Nb modified **PBZT** and
Ba-A-side doped PLZT compns. were studied and discussed. Some of
the compns. with low hysteresis and small temp. coeffs. of the d.c. bias
field-induced piezoelec. properties were developed. A **ferroelec**
. phenomenol. theory for d.c. bias field-induced piezoelec. effect
(effective piezoelec. effect) was developed and employed to reveal the
relation between the instant and the effective piezoelec. properties of
the materials.

ACCESSION NUMBER: 2002:33062 CAPLUS
DOCUMENT NUMBER: 136:302432
TITLE: Effective piezoelectricity of PZT-based
relaxor ferroelectric compositions
AUTHOR(S): Zhuang, Zhiqiang
CORPORATE SOURCE: College of Materials Sci. & Eng., South China
University of Technology, Canton, 510640, Peop. Rep.
China
SOURCE: Ferroelectrics (2001), 261(1-4), 33-42
CODEN: FEROA8; ISSN: 0015-0193
PUBLISHER: Gordon & Breach Science Publishers
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 6 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The morphotropic phase boundary (MPB) in the **relaxor**
ferroelec. Pb(Zn1/3Nb2/3O3)-**BaTiO3**-
PbTiO3 (PZN-BT-PT) system with 15 mol% BT was investigated through
dielec. permittivity and high-temp. X-ray diffraction measurements. It
was revealed that MPB is a broad compn. region extending from 12 to 18
mol% PT, within which the temps. of the permittivity max. are close to the
ending temps. for the phase transformation from coexisting rhombohedral
and tetragonal phases to cubic phase on heating. When the specimen is
cooled, the starting temps. for the rhombohedral-to-tetragonal phase
transition increase with increasing PT content. The large thermal
hysteresis obsd. by X-ray diffraction is caused by the phase
transformation between rhombohedral and tetragonal phases. On cooling,
the MPB curves toward the PT-rich side, so that ceramics within this
compn. range undergo successive phase transitions from cubic to
rhombohedral and from rhombohedral to tetragonal phase. The diffuseness
of the paraelec.-to-**ferroelec.** phase transition is remarkably
decreased by the addn. of PT. The enhanced dielec. permittivity peak
values for the MPB compns. are correlated with the reduced lattice
distortion and phase coexistence.

ACCESSION NUMBER: 2001:597009 CAPLUS
DOCUMENT NUMBER: 135:214721
TITLE: Morphotropic phase boundary in the **Pb**
(Zn1/3Nb2/3O3)-**BaTiO3**-**PbTiO3**
system

AUTHOR(S): Zhu, Weizhong; Kholkin, Andrei L.; Mantas, Pedro Q.;
Baptista, Joao L.
CORPORATE SOURCE: Department of Ceramics and Glass Engineering, UIMC,
University of Aveiro, 'Aveiro, 3810-193, Port.
SOURCE: Journal of the American Ceramic Society (2001), 84(8),
1740-1744
CODEN: JACTAW; ISSN: 0002-7820
PUBLISHER: American Ceramic Society
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 7 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The cofiring characteristics of **BaTiO₃**-modified silver-palladium
alloys electrode and **Pb-based relaxor**
ferroelec. ceramics were investigated. The results obtained
showed that improved interfacial microstructure, repressed interfacial
chem. reactions, and nearly consistent shrinkage behaviors were achieved.
A no-glass frit ceramic-modified electrode system was suggested on the
basis of min. interfacial mismatch and satisfactory interfacial
bonding. Reasonable explanations for this were given in view of phys. and
chem. properties of **BaTiO₃** and its chem. compatibility with
Pb-based relaxor ferroelec.
ceramics.

ACCESSION NUMBER: 2001:238984 CAPLUS
DOCUMENT NUMBER: 135:36103
TITLE: Cofiring behaviors between **BaTiO₃**-modified
silver-palladium electrode and **Pb-**
based relaxor ferroelectric
ceramics
AUTHOR(S): Zuo, R.; Li, L.; Gui, Z.
CORPORATE SOURCE: Department of Materials Science and Engineering, State
Key Laboratory of New Ceramics and Fine Processing,
Tsinghua University, Beijing, 100084, Peop. Rep. China
SOURCE: Materials Chemistry and Physics (2001), 70(3), 326-329
CODEN: MCHPDR; ISSN: 0254-0584
PUBLISHER: Elsevier Science S.A.
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 8 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Switching current measurements have been carried out on **relaxor**
ferroelec. single-crystal, pure PZN, and the solid soln. (1 - x)
Pb(Zn_{1/3}Nb_{2/3})O₃-x **PbTiO₃** with x = 0.04, 0.09, 0.10.
Measurements have been done for crystallog. directions [001] and [111] for
all these compns. Switching **times** vs. the applied field showed
the following. Pure PZN along [111] and 0.90PZN-0.10PT along [001], and
[111] showed an exponential dependence. Along [001], the PZN showed a
linear fit. For solid soln. single crystals 0.96PZN-0.04PT and
0.91PZN-0.09PT, a linear fit was obtained for the reciprocal switch
times vs. applied field for both directions. If we draw a
parallel picture with the reported **barium titanate**
data, it appears that the polarization reversal is controlled by
nucleation along [111] spontaneous direction for PZN and [001], [111] for
0.90PZN-0.10PT. The mobility of the reversed domains controls the
reversal along [001] for PZN and the solid soln. single crystals with
rhombohedral compn. along [001] and [111]. The transient current curves
showed two max. points for crystals with x = 0.04 and 0.09. This is
attributed to the co-existence of the two phases in 0.96PZN-0.04PT and
0.91PZN-0.09PT crystals.

ACCESSION NUMBER: 2000:609430 CAPLUS

DOCUMENT NUMBER: 133:289568
TITLE: Switching current in **Pb**(Zn_{1/3}Nb_{2/3})O₃-**PbTiO₃** single crystals
AUTHOR(S): Belegundu, Uma; Du, Xiaohong; Uchino, Kenji
CORPORATE SOURCE: International Center for Actuators Transducers
Materials Research Laboratory, Pennsylvania State
University, University Park, PA, 16803, USA
SOURCE: Materials Research Society Symposium Proceedings
(2000), 604(Materials for Smart Systems III), 39-44
CODEN: MRSPDH; ISSN: 0272-9172
PUBLISHER: Materials Research Society
DOCUMENT TYPE: Journal
LANGUAGE: English
REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 9 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The conditions of synthesis and sintering processes as well as dielec.
properties of ceramics based on **Pb**(Mg_{1/3}Nb_{2/3})O₃
(PMN) and solid solns. of this **relaxor** with normal
ferroelecs. **PbTiO₃** (PT) and **BaTiO₃** (BT) were
studied. Three kinds of ceramics: PMN, PMN-PT and PMN-PT-BT were
obtained. Dielec. const. values of these materials were 12000 and 21000,
resp. and Curie points -100, 400 and 00, resp. The PMN-PT-BT ceramics
showed low temp. coeff. of capacitance.

ACCESSION NUMBER: 2000:586408 CAPLUS

DOCUMENT NUMBER: 133:274981

TITLE: Capacitor ceramics based on **Pb**
(Mg_{1/3}Nb_{2/3})O₃ with additions of **PbTiO₃** and
BaTiO₃

AUTHOR(S): Kulawik, Jan; Szwagierczak, Dorota

CORPORATE SOURCE: Osrodek Badawczo-Rozwojowy Mikroelektroniki Hybrydowej
Rezystorow, Krakow, Pol.

SOURCE: Elektronika (2000), 41(5), 13-16

CODEN: EKNTBZ; ISSN: 0033-2089

PUBLISHER: Wydawnictwo SIGMA-NOT

DOCUMENT TYPE: Journal

LANGUAGE: Polish

L6 ANSWER 10 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Raman scattering can provide useful information about the behavior of the
correlation function of the polarization and the degree of
ferroelec. ordering (through Raman Selection Rules) in
relaxor systems. These considerations are illustrated by results
on La-modified **lead zirconate titanate** (PLZT),
Ti-modified **lead magnesio-niobate** (PMN-PT) and
Zr-modified **barium titanate** (BTZ). A new low temp.
state in PLZT, demonstrated by Raman scattering and elec. properties
expts., is reported and discussed.

ACCESSION NUMBER: 2000:398151 CAPLUS

DOCUMENT NUMBER: 133:113304

TITLE: Raman scattering from **relaxor**
ferroelectrics and related compounds

AUTHOR(S): Farhi, R.; El Marssi, M.; Dellis, J.-L.; Yuzyuk, Yu.
I.; Ravez, J.; Glinchuk, M. D.

CORPORATE SOURCE: Laboratoire de Physique de la Matiere Condensee,
Universite de Picardie, Amiens, 80039, Fr.

SOURCE: Ferroelectrics (1999), 235(1-4), 9-17

CODEN: FEROA8; ISSN: 0015-0193

PUBLISHER: Gordon & Breach Science Publishers

DOCUMENT TYPE: Journal

LANGUAGE: English

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 11 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
 AB A **time**-dependent, constitutive model is proposed for electrostrictive, **relaxor ferroelec.** materials. The model is **based** on Ising spin theory, and simulates stress, elec. field and temp. dependent phase transformations in a ceramic material. The resulting model is consistent with Devonshire's theory for temp. induced phase transformations, however it captures the non-linear satn. response characteristic of **ferroelecs.** driven by high fields. Elec. hysteresis occurs when bifurcations cause the soln. state to jump between stable branches. The model shows that these bifurcations depend on elec. field, stress and temp. This bifurcation approach differs significantly from phenomenol. models **based** on phase switching. A one-dimensional version of the constitutive model is used to predict the induced strain and polarization as a non-linear function of applied field for a **Lead Magnesium Niobate-Lead Titanate-Barium Titanate** (PMN-PT-BT) ceramic. The results are compared with expts. at various temps.

ACCESSION NUMBER: 1998:770081 CAPLUS
 DOCUMENT NUMBER: 130:132518
 TITLE: Modeling **time**-dependent behavior in **relaxor ferroelectrics**
 AUTHOR(S): Hom, Craig L.; Shankar, Natarajan
 CORPORATE SOURCE: Advanced Technology Center, Lockheed Martin Missiles and Space, Palo Alto, CA, 94304-1191, USA
 SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (1998), 3323 (Mathematics and Control in Smart Structures), 287-298
 CODEN: PSISDG; ISSN: 0277-786X
 PUBLISHER: SPIE-The International Society for Optical Engineering
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 12 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
 AB A 2:1 multiplexed two-dimensional array has been developed which has a sparse element pattern designed for real **time** volumetric imaging and a second element pattern designed for conventional B-mode imaging. For volumetric imaging a small aperture was used to provide a wide transmit beam, allowing multiple beams to be received simultaneously. A larger aperture with a more narrow transmit beam was used for B-mode imaging to improve image quality when multiple receive beams were not required. The multiplexed transducer was fabricated using an electrostrictive **relaxor ferroelec.** material in which array elements were activated and deactivated by a DC bias field.

ACCESSION NUMBER: 1998:279758 CAPLUS
 DOCUMENT NUMBER: 128:328692
 TITLE: Experimental results from an electrostrictive multiplexed 2-D array
 AUTHOR(S): Davidsen, Richard E.; Smith, Stephen W.
 CORPORATE SOURCE: Department of Biomedical Engineering, Duke University, USA
 SOURCE: Proceedings - IEEE Ultrasonics Symposium (1997), (Vol. 2), 1647-1650
 CODEN: PIEUEZ; ISSN: 1051-0117
 PUBLISHER: Institute of Electrical and Electronics Engineers
 DOCUMENT TYPE: Journal
 LANGUAGE: English
 REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 13 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
 AB The **relaxor ferroelec.** ceramics in **Pb**

(Zn₁/3Nb₂/3)O₃-BaTiO₃-PbTiO₃ system were prep'd. by mixed-sintering method. XRD studies revealed that the ceramics have dual-phase composite structure. The dielec. properties of the composite ceramics were studied, and the results showed that the temp. stability, the frequency stability and aging behavior are improved by the composite structure.

ACCESSION NUMBER: 1998:242546 CAPLUS
DOCUMENT NUMBER: 129:31131
TITLE: Phases and dielectric properties of **relaxor ferroelectric** composite ceramics
AUTHOR(S): Yue, Zhenxing; Wang, Xiaoli; Zhang, Liangying; Yao, Xi
CORPORATE SOURCE: Electronic Materials Research Laboratory, Xi'an Jiaotong University, Xi'an, 710049, Peop. Rep. China
SOURCE: Wuji Cailiao Xuebao (1997), 12(5), 710-714.
CODEN: WCXUET; ISSN: 1000-324X
PUBLISHER: Kexue Chubanshe
DOCUMENT TYPE: Journal
LANGUAGE: Chinese

L6 ANSWER 14 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB A review with 40 refs. Fundamental theories of ferroelectricity in perovskite compds. were reviewed. In section 1, the definitions of piezoelectricity, pyroelectricity and ferroelectricity was described according to the crystallog. point symmetry. Series of phase transformation in **barium titanate** was explained by the Devonshire's phenomenol. theory in section 2. In section 3, the Slater's theory was explained in order to consider the microscopic origin of ferroelectricity. The local elec. fields on constitutive ions were calcd. for **barium titanate** and **lead titanate** using Ewald method. A large elec. force worked on the oxide ions below the **titanium** ion in perovskite structure, and the direction of this force was consistent with the direction of displacement of the oxide ions. This meant that a pos. feedback worked on the displaced ions. Slater's theory proposed that the large local field was the origin of ferroelectricity in perovskite structure. In section 4, fundamental aspects of the soft-mode theory was explained. The **ferroelec.** phase transformation was interpreted as a freezing of soft-mode at .GAMMA.-point in Brillouin zone in soft-mode theory. Some famous exptl. results of the soft-modes on perovskite compds. were presented, but for **barium titanate**, a clear exptl. evidence was not obsd. so far because of the over dumping phenomenon. In section 5, some models of **relaxor ferroelects.** were introduced. The 1st Smolenskii's model assumed an inhomogeneity of chem. compn. in materials, but various features of **relaxors** could not be explained by this model. A model recently proposed by Tsurumi explained the dielec. properties of **relaxors** by assuming that the vol. of the polar micro region increased but the relaxation frequency of dipole fluctuation in the polar micro region decreased with decreasing temp. In section 6, unsolved problems in the ferroelectricity of **barium titanate** and other perovskite compds. were specified.

ACCESSION NUMBER: 1997:580389 CAPLUS
DOCUMENT NUMBER: 127:241333
TITLE: Perovskite-related compounds. Ferroelectricity
AUTHOR(S): Tsurumi, Takaaki
CORPORATE SOURCE: Fac. Eng., Tokyo Inst. Technol., Tokyo, 152, Japan
SOURCE: Kikan Kagaku Sosetsu (1997), 32, 84-94
CODEN: KKSOEC
PUBLISHER: Nippon Kagakkai
DOCUMENT TYPE: Journal; General Review
LANGUAGE: Japanese

L6 ANSWER 15 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The effects of different thermal shock treatments on dielec. and elec.

properties of **relaxor based** and **BaTiO₃**

based "0805" Y5V multilayer ceramic chip capacitors (MLCs) were investigated. It was found that thermal shock generally resulted in larger leakage currents and lower breakdown voltages. It is also confirmed that the thermal shock resistance of **relaxor** MLCs is in disadvantage to that of the **barium titanate** MLCs. Nevertheless, no obvious failure was found when the **relaxor-based** MLCs were subjected to the thermal effects in the normal IR solder reflow process. Besides the relatively lower mech. strength, low insulation resistivity and breakdown strength were also proposed to be important contributors to the undesirable reliability of **relaxor** MLCs.

ACCESSION NUMBER: 1997:562398 CAPLUS
DOCUMENT NUMBER: 127:241821
TITLE: Thermal effects on the dielectric and electrical properties of **relaxor ferroelectric** ceramic-based MLCs
AUTHOR(S): Chan, Y. C.; Wang, Y.; Gui, Z. L.; Li, L. T.
CORPORATE SOURCE: Department of Electronic Engineering, City University of Hong Kong, Hong Kong, Hong Kong
SOURCE: Japan IEMT Symposium, Proceedings of Japan International Electronic Manufacturing Technology . Symposium, Omiya, Japan, Dec. 4-6, 1995 (1995), 328-333. Institute of Electrical and Electronics Engineers: New York, N. Y.
CODEN: 64WKA6
DOCUMENT TYPE: Conference
LANGUAGE: English

L6 ANSWER 16 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Addn. to thermally activated flips of polar regions in **relaxor ferroelects.**, a new polarization mechanism, which originates from the vibrations (breathing) of the surface of polar regions, is introduced to explain the dielec. behavior of **relaxor ferroelects.** This new mechanism plays an important role in the dielec. behavior of such materials at low temp. Based on the above assumption and general dielec. theory, a formula is given to characterize the temp. dependence of the dielec. const. The correctness of the formula is verified by using it to fit the exptl. results of the two typical **relaxors**. The fitted results show that the method is of high precision and that the temp. of the dielec. const. max. is decided by the two polarization behavior. It also indicates that the new polarization is a resonance polarization.

ACCESSION NUMBER: 1997:373191 CAPLUS
DOCUMENT NUMBER: 127:129476
TITLE: Investigation of polarization mechanism of **relaxor ferroelectrics**
AUTHOR(S): Cheng, Z. Y.; Katiyar, R. S.; Xi, Yao
CORPORATE SOURCE: Dep. Phys., Univ. Puerto Rico, San Juan, 00931-3343, P. R.
SOURCE: Materials Research Society Symposium Proceedings (1997), 453(Solid-State Chemistry of Inorganic Materials), 455-460
CODEN: MRSPDH; ISSN: 0272-9172
PUBLISHER: Materials Research Society
DOCUMENT TYPE: Journal
LANGUAGE: English

L6 ANSWER 17 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB Compressive prestress effects on the elec. and mech. properties of **relaxor ferroelec.** materials were studied as a function of temp. for several formulations of **Pb(Mg_{1/3}Nb_{2/3})O₃-PbTiO₃-BaTiO₃** (PMN-PT-BT) ceramics. Exptl. measured polarization and strain, induced by an a.c. elec. field, decreased as

compressive stress increased. Effective Young's moduli also were measured under const. d.c. elec. fields. A significant decrease in modulus was obsd. with increasing field. The prestress and modulus expts. were modeled anal. using a proposed **relaxor ferroelec.** constitutive law. In general, excellent agreement between the model and expts. was obtained, indicating that the model accurately predicted the coupled behavior of this **relaxor ferroelec.** material.

ACCESSION NUMBER: 1996:589031 CAPLUS
DOCUMENT NUMBER: 125:228598
TITLE: Electromechanical testing and modeling of a **Pb**
(Mg₁/3Nb₂/3)O₃-**PbTiO₃**-**BaTiO₃**
relaxor ferroelectric
AUTHOR(S): Brown, Steve A.; Hom, Craig L.; Massuda, Mona; Prodey,
Jacqueline D.; Bridger, Keith; Shankar, Natarajan;
Winzer, Stephen R.
CORPORATE SOURCE: Lockheed Martin Lab., Lockheed Martin Corp.,
Baltimore, MD, 21227-3898, USA
SOURCE: Journal of the American Ceramic Society (1996), 79(9),
2271-2282
CODEN: JACTAW; ISSN: 0002-7820
PUBLISHER: American Ceramic Society
DOCUMENT TYPE: Journal
LANGUAGE: English

L6 ANSWER 18 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
AB Evidence has been found that the **relaxor ferroelec.** bears strong resemblance to spin and dipolar glasses. The frequency dispersion of the temp. of the permittivity max., T_m , has been analyzed using the Vogel-Fulcher relationship. The difference between **relaxor ferroelec.** and glass is discussed. Based on this anal. a new relationship is introduced to analyze the frequency dispersion of the temp. of the permittivity max. The dielec. relation of solid soln. of 10 mol% **lead titanate** in **lead** magnesium niobate and La-modified **lead** zinc niobate-**lead titanate-barium titanate** are measured. The results were analyzed using the new relationship and Vogel-Fulcher relationship. These indicate that the new relationship: $\omega = \omega_0 \exp\{-(T_0/T_m)^p\}$ is more suitable for **relaxor ferroelecs.**

ACCESSION NUMBER: 1996:114774 CAPLUS
DOCUMENT NUMBER: 124:209600
TITLE: New glass model of **relaxor ferroelectrics**
AUTHOR(S): Cheng, Zhongyang; Yao, Xi; Zhang, Liangying
CORPORATE SOURCE: Sch. Electronics and Information Eng., Xi'an Jiaotong Univ., Xian, Peop. Rep. China
SOURCE: Xi'an Jiaotong Daxue Xuebao (1995), 29(9), 66-71, 89
CODEN: HCTPDW; ISSN: 0253-987X
PUBLISHER: Xi'an Jiaotong Daxue Chubanshe
DOCUMENT TYPE: Journal
LANGUAGE: Chinese

L6 ANSWER 19 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
AB Several electrostrictive materials were investigated as candidates for high-frequency transducer applications. Families investigated included (1-x)**Pb**(Mg₁/3Nb₂/3)O₃-(x)**PbTiO₃** and PLZT **relaxors**, and Sr-and Sn-substituted **BaTiO₃** normal **ferroelecs.** Field-dependent dielec., piezoelec. and elastic properties were characterized at frequencies between 100 kHz and 5 MHz. The large magnitude and E-field tunability of the electromech. and elastic properties obsd. in several of the materials may present opportunities for several new transducer applications, such as biomedical imaging and non-destructive evaluation.

ACCESSION NUMBER: 1996:93286 CAPLUS

DOCUMENT NUMBER: 124:190973
TITLE: Field-induced piezoelectric materials for 100 kHz-10 MHz transducer applications
AUTHOR(S): Fielding, J. T. Jr.; Jang, S. J.; Shrout, T. R.
CORPORATE SOURCE: Materials Research Laboratory, Pennsylvania State University, University Park, PA, 16802, USA
SOURCE: ISAF '94, Proceedings of the IEEE International Symposium on Applications of Ferroelectrics, 9th, University Park, Pa., Aug. 7-10, 1994 (1994), 363-6. Editor(s): Pandey, R. K.; Liu, Michael; Safari, Ahmad. Institute of Electrical and Electronics Engineers: New York, N. Y.
CODEN: 62GYAM
DOCUMENT TYPE: Conference
LANGUAGE: English

L6 ANSWER 20 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
AB Dielec., **ferroelec.** and elec. field-induced strain properties of (Pb1-xBax)(Zr1-yTiy)O3 ceramics with 0.15 .ltoreq. x .ltoreq. 0.45 and 0.16 .ltoreq. y .ltoreq. 0.70 were studied. A wide range of compns. possessing **relaxor** phase characteristics was found to exist near the boundaries between the **ferroelec.** rhombohedral, tetragonal and paraelec. cubic phases. Within this compositional range, broadened peaks of dielec. const. as a function of both compn. and temp. were identified as well as slim loop hysteresis and frequency-dependent relaxation behavior. Longitudinal field-induced strain for some selected samples and transverse strain for all the compns. studied were detd. Max. total and differential strains were found in the vicinity of the rhombohedral-tetragonal phase boundary. Optimal values of the differential strain were close to (.apprx.80%) those found in PLZT ceramics. Inside the **relaxor** phase region the relation between the strain and elec. field (or polarization) was characteristic of electrostrictive effects. The electrostrictive coeffs., Q11 (longitudinal) and Q12 (transverse) which relate the square of polarization to strain, were evaluated for several selected compns. with **relaxor** characteristics. The values obtained are comparable to those discovered in other **ferroelec.** ceramics such as PLZT and PMN.

ACCESSION NUMBER: 1995:863312 CAPLUS
DOCUMENT NUMBER: 124:19553
TITLE: Dielectric, **ferroelectric** and electric field-induced strain properties of (Pb1-xBax)(Zr1-yTiy)O3 ceramics
AUTHOR(S): Li, G.; Haertling, G.
CORPORATE SOURCE: Dep. Ceramic Eng., Clemson Univ., Clemson, SC, 29634, USA
SOURCE: Ferroelectrics (1995), 166(1-4), 31-45
CODEN: FEROA8; ISSN: 0015-0193
PUBLISHER: Gordon & Breach
DOCUMENT TYPE: Journal
LANGUAGE: English

L6 ANSWER 21 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN
AB **Relaxor ferroelecs.** lead magnesium niobate (PMN) and lead zinc niobate (PZN) and their solid soln. with lead titanate (PT) and barium titanate (BT) were studied. Unlike lead magnesium niobate, the pyrochlore-free material for lead zinc niobate could not be prepd. by reaction between lead niobate and ZnO at <1000.degree.. However, some improved compn. was obtained when lead zinc niobate (85%) and a mixt. of lead titanate (10%) and barium titanate (5%) sintered at 950.degree.. X-ray diffraction examn. of the samples revealed that the lead magnesium niobate prepd. contained 9.9% pyrochlore

phase, whereas the solid soln. between 90% lead magnesium niobate and 10% lead titanate was completely free from the same phase. The dielec. const. for PZN-PT-BT (85:10:5) ternary system was 4000, whereas the same for lead magnesium niobate and its solid soln. with 10% lead titanate was 4100 and 6000 resp. The comparatively low value obtained for PZN-PT-BT solid soln. was probably due to the presence of appreciable amt. of pyrochlore phase. The grain diam. for PMN and PMN-PT (90:10) solid soln. was 1.37 .mu.M and 2.34 .mu.M resp.

ACCESSION NUMBER: 1992:556023 CAPLUS
DOCUMENT NUMBER: 117:156023
TITLE: Relaxor ceramics for multilayer capacitor application
AUTHOR(S): Roy-Chowdhury, P.
CORPORATE SOURCE: Professor S. D. Chatterjee's Res. Lab., Calcutta, 700 019, India
SOURCE: Bulletin of Materials Science (1992), 15(3), 273-7
CODEN: BUMSDW; ISSN: 0250-4707
DOCUMENT TYPE: Journal
LANGUAGE: English

L6 ANSWER 22 OF 22 CAPLUS COPYRIGHT 2003 ACS on STN

AB The crit. exponent .gamma. in the relation between the dielec. const. and temp. ($1/\epsilon - 1/\epsilon_m = C' - 1 \times (T - T_m) \cdot \gamma$) was detd. precisely for the relaxor ferroelects. Pb(Mg_{1/3}Nb_{2/3})O₃, Pb(Zn_{1/3}Nb_{2/3})O₃, and a related solid soln. 0.88Pb(Zn_{1/3}Nb_{2/3})O₃-0.12PbTiO₃, as well as for normal ferroelects . BaTiO₃ and K(Ta_{0.55}Nb_{0.45})O₃. A high correlation of the .gamma.-value with the phase transition diffuseness was found empirically. Moreover, this .gamma.-value is very close to another crit. exponent .gamma.* which is defined in the relation between the dielec. const. and hydrostatic pressure ($1/\epsilon - 1/\epsilon_m = C' - 1(p - p_m) \cdot \gamma^*$).

ACCESSION NUMBER: 1982:537263 CAPLUS
DOCUMENT NUMBER: 97:137263
TITLE: Critical exponents of the dielectric constants in diffused phase transition crystals
AUTHOR(S): Uchino, Kenji; Nomura, Shoichiro
CORPORATE SOURCE: Dep. Phys. Electron., Tokyo Inst. Technol., Tokyo, 152, Japan
SOURCE: Ferroelectrics (1982), 44(3), 55-61
CODEN: FEROA8; ISSN: 0015-0193
DOCUMENT TYPE: Journal
LANGUAGE: English

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